

Claims

1. A control method for a valve actuator, in particular for a piezoelectric actuator (CP, 6) of an injection valve for an internal combustion engine, comprising the following steps:

- charging and/or discharging the actuator (CP, 6) to various charge states, each corresponding to a valve position,
- controlling the charging and/or discharging according to a specified control action corresponding to a specified setpoint value (S_{setpoint}) for the charge state,
- determining a controlled variable (S_{actual}) reflecting the charge state of the actuator (CP, 6) and/or the valve position, the controlled variable (S_{actual}) being determined in an idle time between two consecutive chargings or dischargings,
- regulating the control action as a function of the controlled variable (S_{actual}), the control action being adjusted in an idle time between two consecutive chargings or dischargings,

characterized in that at least one external measured variable is additionally acquired and the control action is regulated as a function of the external measured variable, the external measured variable being the pressure at the valve.

2. The control method according to claim 1, characterized in that the actuator (CP, 6) is also charged and/or discharged to charge states corresponding to a partially open valve position.

3. The control method according to one of the preceding claims,

characterized in that
to determine the controlled variable (S_{actual}), the voltage across the actuator (CP, 6) and/or the charge of the actuator (CP, 6) is measured.

4. The control method according to at least one of the preceding claims,

characterized in that
the control action for charging is determined by a specified charging characteristic and/or the control action for discharging by a specified discharging characteristic, the charging characteristic and the discharging characteristic having a specified shape and steepness.

5. The control method according to claim 4,
characterized in that

the steepness of the charging characteristic and/or of the discharging characteristic is adjusted as part of the regulation.

6. The control method according to claim 4 or 5,
characterized in that

the shape of the charging characteristic and/or of the discharging characteristic is adjusted as part of the regulation.

7. The control method according to one of the preceding claims,

characterized in that
the control action is determined by the charging duration and/or the discharging duration (T_{charge}), the charging duration

and/or the discharging duration (T_{charge}) being adjusted as part of the regulation.

8. A control device for at least one valve actuator, in particular a piezoelectric actuator (CP, 6) of an injection valve for an internal combustion engine, having

- a controller (5) for controlled charging and/or discharging of the actuator (CP, 6) to specified charge states corresponding to a specified setpoint value (S_{setpoint}), wherein each of the charge states corresponds to a valve position and the controller (5) exhibits a specified control action,
- a regulator (7) for adapting the control action of the controller (5), wherein the regulator (7) is connected on the input side to the actuator (CP, 6) and/or the valve in order to acquire a controlled variable (S_{actual}) and the controlled variable (S_{actual}) reflects the charge state of the actuator (CP, 6) and/or the valve position and the regulator (7) acquires the controlled variable (S_{actual}) discontinuously in idle times in each case and adjusts the control action discontinuously in idle times in each case,

characterized in that to acquire at least one other controlled variable the regulator (7) is connected on the input side to at least one sensor which detects the pressure at the valve.

9. The device according to claim 8,

characterized in that the regulator (7) is superimposed on the controller (5).